

# ALLAHABAD AGRICULTURAL INSTITUTE

## Department of Agricultural Economics & Rural Sociology CERTIFICATE OF ORIGINAL WORK

This is to certify that Shri P. Prasada Rao of the University of Allahabad, planned his study, carried out the experimental work involved, analysed the data and prepared this thesis on "A Comparative Study into the Economics of Local and High Yielding Varieties of Cotton in Tyalluru Block, Guntur (Andhra Pradesh)".

This he did in part fulfilment of the requirements for the Master of Science in Agricultural Economics Degree of the University of Allahabad.



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**CERTIFICATE OF CHAIRMAN**

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**The thesis attached hereto, entitled  
"A Comparative Study into the Economics of Local  
and High Yielding Varieties of Cotton in Tyalluru  
Block, Guntur (Andhra Pradesh)" prepared and  
submitted by Shri P. Prasad Rao in partial  
fulfilment of the requirements for the degree of  
MASTER OF SCIENCE IN AGRICULTURAL ECONOMICS is  
hereby accepted.**

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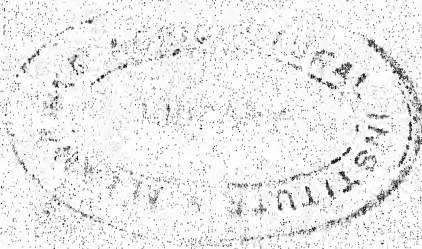
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## **CHAPTER I**

## INTRODUCTION

If growth means provision of more goods and services per capita to the members of a society, production becomes a pre-condition of society's progress.

In a low income predominantly agricultural country, as ours is, the rate of growth of the economy is the function of rate of growth of agricultural sector. But ever since independence, India has been facing the problem of food shortage.

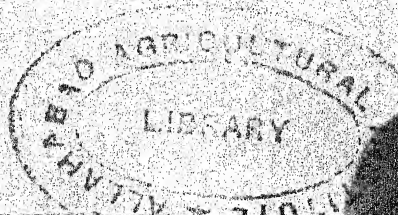
Removal of poverty and attainment of economic self-reliance are the two goals that the country has set for itself. The policy implications these two goals are to become self sufficient in food supply, economise in the use of imports and to expand exports. The main elements of the self-reliance objectives formulated by the Government in the Fifth Five year plan were (i) elimination of special forms of external assistance and (ii) phasing for the realisation of the goal of self-reliance.

A wide varieties of crops and the influence of food over non-food crops are the two distinct



Characteristics of Indian agriculture. Their share in exports, industrial requirements, national output, consumption etc. are few variables determining the importance of the crops. About forty crops are cultivated in India. The most important crops cultivated in India are rice, wheat, Jowar, maize, gram, ground-nut, cotton and sugarcane. The crops account for 44 percent of the total consumer expenditure, form 58 percent of the agricultural output and share 67 percent of the cultivated area and 75 percent of the irrigated area. One factor that has affected the commercial crops and inhibited their growth has been the process of attaining self-sufficiency adopted by the Government in the past (for example, in zonal system of food grains trade, each state was considered a separate zone, which implied that each state should be sufficient in food-grains production. The zonal self-sufficiency in food grains imposed constraints on cultivation of commercial crops.

Cotton is one of the most important commercial crops and occupies an important place in the agricultural and industrial economy of the country. Cotton occupies a dominant position among the cultivated crops, which meets the material needs of the mankind. India was principal source of cotton for Great Britain and Europe in the past. India, which was a net exporter of cotton before partition became net importer of cotton after partition. From 1965 India imported an average of 2,44,000 bales of U.S. cotton annually upto June 1971 and spent about Rs 1,000 crores during





the same period. Within this picture, it may be noted that amongst 60 countries where cotton is grown, India with about 8 million hectares ranks first in the world in respect of acreage under cotton and fourth in total production. The average yield of cotton in India is only 145 Kg/ha, which is very low when compared to 1098, 853, 491 and 300 Kg/ha in Israel, USSR, USA and China respectively<sup>2/</sup>

The crop, both in its raw and manufactures forms, yield a considerable revenue apart from earning foreign exchange to the worth of about Rs 77 crores a year. The cotton textiles industry is the biggest industry in India, being the main stay for a very large number of farm growers, traders, hand looms, weavers and a number of others who are engaged in the textile industry and trade. Cotton seeds provide a highly nutritious concentrated feed to the cattle with the development of technology cotton seeds are being used for extraction of oil for industrial use and edible purpose. Cotton leaves can be used as an economic source for the production of citric acid saving for the country lakhs of rupees. The utilisation of the by products of cotton would also strengthen the economy of cotton growers.

1. Mirchandani, G.G. 1971. Aspects of Agriculture in India (UNR Record). Bombay : Allied Publishers. 184.
2. Singh, M., Singh, K. and Brar, H. 1974. How Cotton Yield can Be Raised. Progressive Farming. March. 10.



Cotton improvement work started from 1967 with the initiation of co-ordinated all India programme. Many improved varieties like Sujata, Krishna, Bharti, Mahalsoni etc. are now available in different cotton growing tracts. The advent of MCU - 5 and H<sub>4</sub> extra long staple cotton is considered to be a significant mile-stone in cotton research.

The Government launched a three year programme with a view to becoming self-sufficient in cotton by adopting promotional measures suited to both irrigated and rainfed areas. Implementation of this programme started in 1971-72.

The recent international developments in the cotton textiles are (1) the textiles being labour intensive are ceasing to be economical for labour scarce, high wage advanced economies, (2) There are signs of shift in consumers preference in several countries in cotton textiles and (3) the sharp rise in the price of petroleum is likely to work to the advantage of cotton textiles in relation to the synthetic fibre fabrics.

Our cotton production is much short of our requirement. The country has, during 1975-76 entered an agreement of purchasing two lakhs bales of cotton worth Rs 25 crores from Pakistan. It is estimated that raising average cotton yield from 122 to 150 Kilograms/acre would meet our requirements. For reasons already discussed, extra acreage under cotton can only be put at the cost of food grains crops and



in view of low productivity it does not seem likely that there would be significant influence on cotton production. On the other hand most of the crops are rainfed and cultivation of low yield potential varieties belonging to desi cotton is high. It is worth noting here that nearly 60 percent of the total cotton area is under desi varieties, which have an average yield of 70 Kg/ha. Consequently 60 percent of the total cotton producing area accounts for only 30 percent of cotton production. The area under irrigated American cotton accounts for nearly 21 percent of the area and about 49 percent of the total production of cotton. The remaining area is under rainfed cotton and yields an average of about 135 Kgs/ha as against about 320 Kg/ha in irrigated American cotton area.

The general problem with respects to the crops thus appears to be the low yield both in traditional as well as for high yielding strains of cotton. It needs to be investigated whether more area under irrigated cotton can be brought. In this connection it may be pointed out that according to the Draft Fifth Five year plan two million more hectares are proposed to be brought under irrigated cotton.

Andhra Pradesh is an important cotton growing state, but the growth rate of productivity is high as compared to other cotton growing states. Within Andhra Pradesh cotton is mostly concentrated in Chilakaluripet region of Guntur district. Important characteristics of Guntur district is suitability of soils for cotton cultivation and irrigation facilities are also there.



**Justification:** High Yielding Varieties of cotton under irrigated conditions would be helpful in planning for cotton production. A study of the comparative profitability of these cotton varieties in an area where cotton is a main cash crop will enable an appraisal of development and suggest guidelines to improve the profitable production of cotton. It is hoped that this study will also be useful to the planners and technicians in the related field.

**Objectives:**

1. To find out the cost of production per hectare and per quintal and determine different measures of profits for local and high yielding varieties under different size groups.
2. To examine the utilization of family and hired labour on different sizes of holdings.
3. To examine the input-output ratio.
4. To find out the most suitable high yielding varieties of cotton for the selected area.
5. To evaluate how efficiently the prevalent factors are being used for the production of cotton, under given conditions.

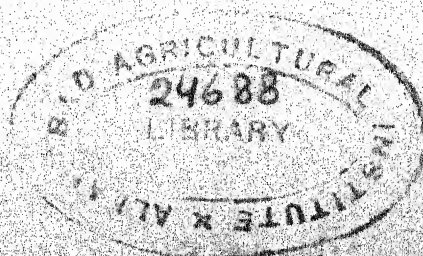
**Hypothesis:**

1. The utilization of family labour decreases with increase in size of holding and hired labour increases with increase in size of holding.



2. Cost of cultivation, output, net income, family labour income and farm business income per hectare decreases with the increase in size of holding.
3. Input-output ratio of different varieties differs significantly and decreases with increase in size of holding.
4. Cost of production per quintal of cotton significantly differs and increases with increase in size of holdings.

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## CHAPTER II



## REVIEW OF LITERATURE

Several attempts have been made to work out the input-output analysis of cotton. A brief review of the important observations made by eminent authors, is given below.

With a self-sufficiency in foodgrain production in sight, there is need for increasing attention to the problem of production and marketing of the commercial crops. It is in this context that depth studies of individual commodities could be fruitful.<sup>1</sup>

Recently at the cotton seminar held in Hyderabad the Union Minister for Agriculture, Mr. A.P. Shinde made this point when he said, "If it is a question of lack of inputs, we have to identify the reasons for the same and take steps to ensure that the optimum doses are applied in every hectare."<sup>2</sup>

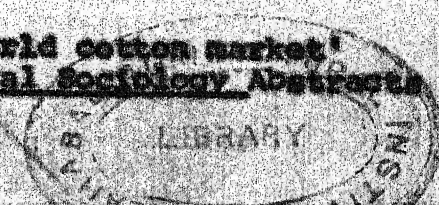
Cotton is grown in more than 70 countries, the majority of which are developing, the number of people earning their living from production and treatment of cotton is more than 100 million. It is the largest source of foreign exchange for the third world war.<sup>3</sup>

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1. G. Parthasarathy, Indian Journal of Agricultural Economics, Vol. XXVII, No. 2, April-June, 1972, pp. 103

2. Shukla Beera - 'Intensive Agriculture', Vol. No. 7, September 1972, pp. 119

3. Raingard, J.E. 'Expansion of the world cotton market' World Agricultural Economics and Rural Sociology Abstracts Vol. No. 16, 411, Nov. 1974 pp 16-17





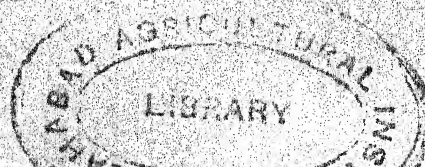
Reddy and Venkateswarlu (1972-73) conducted a survey of 25 farmers in order to examine the costs and returns from cotton-MCU-5 cultivation. The total cost of cultivation of one hectare of MCU-5 cotton was found to be Rs 2067. Of this the labour cost was Rs 620 i.e., about 30 percent and material cost was Rs 1447 i.e., about 70 percent. Total cost of Rs 2067 does not include items like rental value of owned land, interest on capital, and depreciation on implements and machinery. The average yield per hectare obtained was 20 quintals and the gross income per hectare was Rs 6280. The cost benefit ratio obtained was 1 : 2.04.<sup>4</sup>

C. Rajagopal Reddy (1973-74) conducted a survey of 20 farmers in five villages in Guntur district to compare the economics of cultivation of Varalaxmi cotton with that of MCU-5.

The total cost of cultivation of an acre of Varalaxmi cotton and MCU-5 found out to be Rs 2,716 and Rs 1,715 respectively. Of this the labour cost accounts for Rs 886 and Rs 635 and material cost Rs 1,830 and Rs 1080 respectively for Varalaxmi and MCU-5. In both cases, pesticides occupy major portion followed by cost of seed in case of Varalaxmi and cost of manures and fertilizers in case of MCU-5.

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4. Reddy, A.S. and Venkateswarlu, U., "The Economics of Cotton (MCU-5) Cultivation in Guntur District, Andhra Pradesh," Agriculture and Agro-Industries Journal, Vol. VI, No. 11 Nov. 1973, pp. 3-4.





The average yield obtained from one acre is 10 quintals of kapas for Varalaxmi and 8 quintals of kapas MCU - 5. The net income derived from one acre is Rs 5,809 for Varalaxmi and Rs 2,110 for MCU-5 indicating more net income for Varalaxmi. The benefit cost ratio is 1.00 : 2.14 and 1.00 : 1.23 respectively for Varalaxmi and MCU-5 meaning Varalaxmi cotton growers receive higher profits.<sup>5</sup>

As a result of intensive research throughout the country few high yielding and better quality cotton like Hybrid - 4, MCU - 5, Sujata, Varalaxmi etc. have been evolved. Their yield and quality characters have been recognised by the mills and the cultivators alike. Hybrid - 4 has already made an impact. It will take some time for other quality strains to spread to larger areas so that they could contribute substantially to the overall production in the country.

Greater emphasis on the availability of remunerative prices to cotton growers could be laid so that the present level of cotton area is held intact and thus checked from diversion to other food and competing crops.<sup>6</sup>

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5. C. Rajagopal Reddy "Economics of Varalaxmi Cotton Cultivation in Guntur district, Andhra Pradesh". Financing Agriculture. Vol. VI, No. 4, January 1975, pp. 16-17

6. P. B. Rao, M. V. Pavate, B. V. Verma, "Shift of area, towards better staple Cotton". Agriculture and Agro-industries Journal Vol. 7, No. 7, July 1974, pp. 13-16.



Shukla B.D. and Singh (1965-66) collected input-output data from 32 cotton producers in the Mathura district. The cost of production of cotton per acre varied between Rs 148 on large farms and Rs 185 on small farms. The value of output per acre varied between Rs 276 and Rs 309 respectively. Analysis of distribution of costs on input factors per acre showed that human labour constituted about 59 percent of the total cost on all farms and bullock labour accounted for about 13 percent. The proportion of family labour employed on farms gradually decreased while that of hired labour tended to increase as the size of holding increased. Net income increased with the increase in the size of farm.

The input output ratio increased from 1 : 1.67 on small farms, 1 : 1.87 on large farms, probably due to economics of scale. It is suggested that there is wide scope for increasing the output by increasing the level of inputs with a view to increasing the level of employment and standard of living of farmers in the district.<sup>7</sup>

Dixit R.S. and Mishra (1968) conducted a survey on economics aspects of cotton cultivation in Intensive Agricultural District programme Block Mathras of Aligarh district. The analysis shows the area under cotton per farm and percentage area under cotton to total cropped area increased with the size group, cereals were grown in small

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7. Shukla, B.D. and Singh R.S., "Economics of Cotton Cultivation in Mathura District". World Agricultural Economics and Rural Sociology abstracts Vol. XI, No. 4, Dec. 1969 pp.200.



size groups. Similarly, large size groups used larger quantities of fertilizers, adopted improved technology over a larger area and costs of production per quintal and per hectare were lower.

On the whole, the study showed that large farmers benefited most by the Intensive Agricultural District programme.<sup>8</sup>

All India coordinated cotton improvement project conducted trials in Haryana, Punjab, Rajasthan, Karnataka and Tamil Nadu.

The project was revealed an additional yield of 580 Kg. per hectare can be obtained from irrigated cotton by adopting improved techniques with optimum fertilizer dose and pesticide coverage.

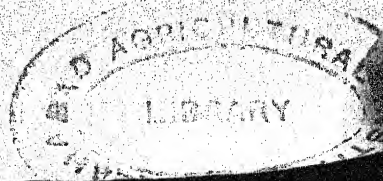
The increase of 120 Kg per hectare in Haryana, 130 Kg in Punjab, 50 Kg in Rajasthan, 94 Kg. in Karnataka and 272 Kg. per hectare in Tamil Nadu was brought about by the adoption of the improved production techniques.<sup>9</sup>

A.C. Gangwar and Singh I.J. collected input-output data of the desi and American cotton from 41 farmers in Hissar district.

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8. Dixit R.S., Mishra, S.D. "An Economic Analysis of Cotton Cultivation", Agricultural Situation in India, Vol. XXIII, No. 10, Jan. 1969, pp. 1031-6.

9. Choken Singh, "More from Irrigated Cotton" Intensive Agriculture, Vol. XII, No. 10, Dec. 1974, pp. 14





The cost of cultivation of Deshi and American cotton based on the existing cultivation practices followed by the farmer was Rs 1,665.74 and Rs 2,394.2 per hectare. The net income per hectare for the Deshi and American cotton was Rs 927.59 and Rs 1,358.01 respectively. Input-output ratio of both the types of cotton was 1 : 1.50. The yield variability of both the varieties of cotton was more or less the same but the price variability found to be higher in the case of American cotton. The cultivation of both the varieties of cotton remains profitable even after discounting the yield and price variability.<sup>10</sup>

The study was confined to villages of Sinor Taluqa of Baroda district, which has been covered under the intensive cotton development programme.

The average cost of cultivation of Digvijay cotton worked out to Rs 1,914.44 per hectare and that for MCU - 5 cotton worked out to Rs 2,088.71. On an average the Digvijay cotton gave a net return of Rs 2,194.37 per hectare and MCU-5 cotton gave a net return of Rs 2,731.96 per hectare. The average input-output ratio at cost C calculated to be 2.14 and 2.32 for Digvijay and MCU - 5 cotton respectively.<sup>11</sup>

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10. Gangwar, A.C. and Singh I.J. "Economic feasibility of financing cotton growers in Hissar District Haryana." "Finance Agriculture" Vol. VII, No. 1, April-June 1975, pp. 14-16.
11. Madalia, V.K., Bhakadia, M.U. "A study on Economics of Cotton Cultivation in Baroda District." "Finance Agriculture" Vol. VII, No. III, Oct-Dec, 1975, pp. 15-18.



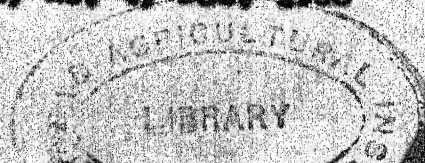


The input - output relationship in the production of the two selected varieties of cotton i.e. Digvijay (short staple,) and Devitej (long staple) was investigated by a survey in a typical cotton growing tract of North Gujarat. The economic possibilities of increasing the net income of the cotton growers by changes in the input mixture were also explored. Regression analysis is used to generate production, coefficients and an estimating equation shows that there are constant returns to scale in cotton production with land, seed, manure and irrigation, labour and investment in implements as the independent variables.<sup>12</sup>

Garg and Singh (1969-70) conducted a study on the economics of production and marketing of cotton in Debai block of Bulandshahr district. The study was related to two varieties of cotton, viz.,- Pramukh (An American Variety) and Shamli (Deshi variety), on four size groups of land holding.

The analysis reveals that, on an average the Pramukh variety gave an additional net income of Rs 334.27 per hectare over Shamli. Net income for the Pramukh and the Shamli was Rs 693.77 and Rs 359.50 per hectare respectively. The output and input per hectare showed an increasing trend with the increase in size of farms upto third size group of 4 to 6 hectares. The input-output

12. Maharaja, M.H. "Economics of Cotton Cultivation, "A Study in a selected region of Saburkantha District in Gujarat" World Agricultural Economics and Rural Sociology Abstracts, Vol. VIII, No. 4, Dec. 1966 p. 706.





ratio in the Pramukh was higher than in the Shamlī and came to 1 : 2.32 and 1 : 1.80 respectively. The yield per hectare also showed an increasing trend with the increase in size of farms in both the varieties. But per hectare costs in both the varieties showed increasing trend upto the size group of 4 to 6 hectares, whereas cost per quintal in same group was found much below in Pramukh variety. The average cost of production per quintal for variety Pramukh was Rs 66.73 and Rs 74.88 for variety Shamlī, which has got less market value.<sup>13</sup>

The inadequate plant population in cotton is the result of wide plant to plant distance in sowing, poor quality seed, high seedling mortality and heavy infestation of weeds during the early part of the growth. The simplest method to overcome these drawbacks, to certain extent, would be to increase the seed rate by adjusting close distance between plant to plant so that desired plant density is obtained in the field and timely weeding in early growth stage.<sup>14</sup>

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13. Garg, J.S. and Singh, G.N., "Economics of Production and Marketing of Cotton in Bulandshahr district - A case study", Agricultural Marketing, Vol. XIII, No.3, Oct. 1970, pp. 1-5.

14. Mudholkar, Ahalawat, I.P.S.J. "A Population Explosion in Cotton for higher Production", Farmer and Parliament Vol. VIII, No. 8, Aug. 1973 pp. 15-16.

Government launched a three year programme with object to end the present stagnation in cotton production by adopting promotional measures suited to both irrigated and rainfed areas for making the country self-sufficient in this commodity. Implementation of this programme started in 1971-72.

Irrigated Areas: The irrigated area for cotton is spread over some 55 districts of the country. Under the programme, six districts have been selected in the irrigated zone: Ferozpur and Bhatinda in Punjab, Hissar in Haryana, Sriganaganagar in Rajasthan, Baroda in Gujrat and Coimbatore in Tamil Nadu. It was proposed to cover a total of four lakh hectares of cotton cultivated area in these districts in 1971-72, additional 80,000 hectares in 1972-73 and yet another 80,000 hectares in 1973-74.

Non-irrigated Areas: In non-irrigated areas it was proposed to initiate a programme on pilot basis in approximately 1.40 lakh hectares spread over seven districts in different States. These are Kurnool in Andhra Pradesh, Surendranagar in Gujrat, Khargone in Madhya Pradesh, Akola and Yestmal in Maharashtra, Dharwar in Mysore and Tirunelveli in Tamil Nadu.

In each selected district an area of 2000 hectares covered under the 'intensive programme' and another 18,000 hectares under the 'expanded programme'.<sup>15</sup>

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15. . . . . "Stepping Up Cotton Production - Three-Year Programme Launched", Farmer and Parliament, Vol. VI(9), September 1971, pp . 19-21.



Differentials in the growth of productivity of food grains and commercial crops among different districts of the Punjab State are studied by fitting a linear function to productivity data. The results showed that in almost all the major crops, the growth rates of yield are found statistically significant except in the case of rice and gram. 16

The causes for the unsteady production of cotton are lack of relative price stability to give greater assurance of steady income and so crops shifts by the farmers, lack of irrigation supply in the hard black soil areas where cotton is grown mostly, susceptibility of the crops to pestilence, unfavourable sowing and harvesting, climatic and weather conditions in several parts of the country, lack of effective impact of package measures.

To produce more of finer varieties of cotton- new dimensions of efforts on production practices and inputs, irrigation and water management supplies of improved seeds for planning fertilizer use, weed and pest control, harvesting techniques are essential. For improvement in the marketing system in the interests of cotton growers and users, new dimensions of effort on price policies.

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16. R. Kaul, J.C., Sondhi, R.K. "Differential growth of productivity in the Punjab" World Agricultural Economics and Rural Sociology Abstracts.  
Vol. 16, No. 1, Jan. 1974, pp. 38

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grading, storing, marketing, finance, ginning and baling etc. are essential for increase cotton production.<sup>17</sup>

Rute reported the results of a Pilot 4-P Project which was undertaken on cotton Hybrid-4, in about 182 acres in Baroda, Kaira and Broach districts on farmers field during the year 1971-72. The results of this project had also been excellent and the average yield of seed cotton was about 10 to 12 quintals per acre which was 2 to 3 times more than average yield of seed cotton and gave nearly Rs 1000 per acre as net profit to participating farmers. The cost of cultivation has also been calculated taking into consideration all inputs including the labour put in by farmer himself. It came to about Rs 1750/- per acre, which does not include the rental value of owned land and interest on capital.<sup>18</sup>

Pattanashetti, C.C., and Gopal Rao, H.S. (1966) conducted a case study of Hubli regulated market. Discussing grading of agricultural commodities, they gave a comparative picture of the benefits received by the sellers of cotton

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17. Muthuswami Gopalan, 'Importance of white gold in the nation's economy,' Khadi Gramodyog, Vol. XV, No. 9, pages 441-444.

18. Rute, S.B., "Crop Insurance Under GSFC 4-P Plan" Agriculture and Agro-industries Journal, Vol. VI, No. 11, Nov. 1973, pp. 5 - 8.



for the months of March, April and May 1964. Value per unit of graded and ungraded cotton was calculated separately and the difference between the unit prices of graded and ungraded cotton was derived. On an average, the grading of cotton resulted in a net gain of ₹ 13.79 per quintal during 1963-64.<sup>19</sup>

A survey (1965) was undertaken by I.C.A.R. in collaboration with Indian Central Cotton Committee and Indian Central Oilseeds Committee to study the cost of cultivation of cotton and rotational crops. The survey was conducted in important cotton growing districts of Maharashtra, namely - Buldhana, Akola, Amravati, Yeshwantnagar, Jalgaon and Aurangabad. It was observed that relatively low average dose of manures and expenditure on manuring to be very low. The percentage of fields manured was only about 40 percent. Another noteworthy feature of cotton cultivation in this region is appreciable amount of female labour employed in this crop, particularly for the operation of weeding and picking cotton. The operational cost of ₹ 15.24 per maund was incurred. It was observed that the total operational cost per acre was ₹ 56.69.<sup>20</sup>

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19. Pattanshetti, C.C. and Gopal Rao, H.S., "Regulated markets and Agricultural Prices", The Journal of Karnataka University - Social Sciences, Vol. II, May 1966, p. 12.
  20. "Cost of Cultivation in Maharashtra State", Statistical News Letter, I.A.R.I., New Delhi, Vol. XII, No. 1, April 1965, pp. 12-15.

## · CHAPTER III





## MATERIALS AND METHODS

### Nature and Scope of the Enquiry

The enquiry was conducted to study the economics of cotton cultivation in the selected block cotton is the main cash crop and is grown by about 90 percent of the cultivators in the region. The present study is confined to high yielding varieties and traditional varieties under irrigated and non-irrigated conditions in the area covered by the Tyalluru block in the Guntur District of Andhra Pradesh. The high yielding varieties not only give high yield but also give better in ginning percentage. The study would enable a comparison of the profitability of these varieties in the area of study under the management practices followed by different cultivators. This study, being one of the farm management investigations, can give not only general information regarding the selected block but also serve as basis for sound agricultural policies and other development programmes in relation to agriculture

### Selection of sample

#### The Block

The Tyalluru block was a purposively selected because of convenience in the collection of data as well as being a typical cotton growing region.

The total geographical area of the Guntur district is 500 square miles. The soils are black cotton soils.

The main staple food of the people is paddy and jowar. The main cash crops grown in the region are cotton, sugarcane, pulses and tobacco.

The summer season starts from March to May is followed by the south-west monsoon season from June to September. The minimum and maximum temperature ranges between 90°F and 118°F. This climate is most suitable for cotton cultivation.

The district is comprised of eight taluqs viz., Sattenapalli, Guntur, Tenali, Repalle, Bapatla, Narasaraopet, Vinukonda, Palnad. The present area of operation covering the Tyalluru block is one of the block in Sattenapalli Taluq.

The following table gives the details of the land utilization in the block.

Table 3.1 Land Utilization in Tyalluru Block.

Sl.	Particulars	Area in hectares	Percentage to total
1.	Area under forest	836	1.42
2.	Area not available for cultivation	15058	25.62
3.	Other uncultivated land excluding current fallow	5216	8.81
4.	Current fallow	4775	8.12
5.	Net area sown	32889	55.96
6.	Total Geographical area	58774	100.00

Source: The block Head quarter Tyalluru 73-74.



Cropping pattern of the block, area under different crops is given in table 3.2.

Table 3.2 Area and out-turn from principal crops in Tyalluru Block.<sup>2/</sup>

S.No.	Crops	Area in Hectares	Out-turn in quintals
1.	Cotton	5943	106974
2.	Chillies	2110	24130
3.	Paddy	9059	226475
4.	Ground-nut	4186	41860
5.	Jowar	1607	8075
6.	Red gram	471	1413
7.	Pulses	2716	8148
8.	Tobacco	1957	13699
9.	Gram	49	252
10.	Turmeric	233	4660
11.	Castor	211	844
12.	Coriander	1100	4400
13.	Vegetables	54	540
14.	Fruits crops	4	NA
15.	Miscellaneous	3449	NA

(N.A. : Not available)

<sup>2/</sup> Ibid.

### Selection of Villages

A list of all villages 54 in the block was obtained from the block development office and was arranged in ascending order of net area sown. Five villages were then selected by the method of systematic sampling.

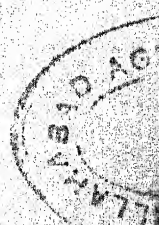
The details of area and population of the selected villages are given in the following table.

Table 3.3. Population and area of the selected villages

Sl. No.	Name of the village	Population	Total geographical area(hac)	Net area sown
1.	Mandapudi	2093	2346	2213
2.	Nemalikalli	1192	1328	1206
3.	Kambhampadu	4818	3557	3274
4.	Patibandala	4236	3129	2987
5.	Parasa	1028	630	592

### Selection of Cultivators

A list of farmers growing HYV cotton was obtained from the lekhpals of the selected villages. In each sample village 10 percent of the total farm holdings were selected by a method of selection where probability of selection was being propotional to size of holding. Thus, a sample of 52 farm holdings was obtained from a total of 261 holdings in the selected villages.





The following table gives the distribution of sample cultivators in selected villages.

Table 3.4 Distribution of Sample Cultivators in Selected Villages

Sl.No.	Name of the villages selected in sample	Number of cotton growing farmers	
		Total	Selected
1.	Mandepudi	65	13
2.	Nemalikallu	51	10
3.	Kambhanpadu	54	11
4.	Patibandala	61	12
5.	Parasa	30	6
U	Total	261	52

For studying the profitability of each variety on different sizes of holdings the selected cultivators were again stratified into three groups on the basis of their size of holding.

Group I : Cultivators having 1 to 2.99 hectares of land.

Group II: Cultivators having 3 to 5.99 hectares of land.

Group III: Cultivators having land of 6 hectares and above.

The distribution of cultivators in respective size of groups is given in the following table.

Table 3.5 Distribution of cultivators according to groups and varieties

Group	H.Y.Vs	Local Varieties
I	15	8
II	11	7
III	7	4
Total	33	19

#### Method of Enquiry

Survey method was used for the collection of data. The cultivators were interviewed twice.

#### Schedules and Questionnaires

Family schedule was used for the collection of data, a proforma of which is given in appendix.

#### Period of Enquiry :

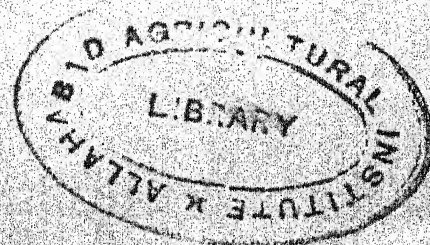
This related to agricultural year 1974-75. The field investigation was undertaken in the months of June and July 1975

#### Method of Analysis

The tabular method was used for the analysis and same statistics such as analysis of variance and t-test of significance were worked out for interpretation of results.



## CHAPTER IV



## RESULT AND DISCUSSIONS

The absolute value of input and output as well as the relationship between them and among the various constituents of input factor is determined by structure of holdings. Therefore, in this Chapter, the structure of survey sample holdings has been discussed to provide the necessary background for proper understanding of farm economy and economics of individual enterprises. The discussions on structure of holdings here refers to their size groups, the cultivated area commanded by each size group, land utilization, intensity of cropping etc.

### Average size of holdings:

In order to examine the details about farm productivity or productivity as related to some particular enterprise determining the average size of holdings becomes useful. The average size of holdings for respective group is given in the table 4.1

Table 4.1 Average Size of Holding

Size Group	Number of holdings	Area under each size group		Average size of holding
		in hectares	Percentage	
I (1-2.99 hectares)	23	58.20	22.05	2.53
II (3-5.99 hectares)	18	82.10	31.12	4.56
III 6 hectares & above	11	123.50	46.82	12.14
Total	52	263.80	100.00	5.27



It is clear from the table 4.1 that the average size of holdings were 2.53 and 4.56 in group I and group II farmers respectively and their ranges were equal. The third group's average size of holdings was 12.14 which was higher than first and second groups.

#### Structure of Sample Families:

Decision-making in the management of farm is closely related to the structure of farm families. The size of family plays an important role in the economy of farming and gives an idea about the pressure of population on land. The age and sex wise composition of the family gives an idea regarding the number of working age members in light of the income earning capacity. The composition of an average family according to sex and age is given in the table 4.2 below.

Table 4.2 Composition of an Average Sample Family

Size Group	Average size of family	Percentage of		Percentage of Age groups		
		Male	Female	0-14 years	15-59 years	60 & above years
I	4.26	58.75	41.25	26.12	52.63	21.25
II	6.30	56.16	43.84	24.33	62.62	13.05
III	5.20	17.13	42.87	40.50	45.20	14.30
Sample Average	5.17	57.51	42.49	28.54	54.51	16.95



It is revealed from table 4.2 that the average size of family in the sample comprises of 5.17 members working age-group (15-59) members were more in Group II (62.62) than the other groups. The percentage of below 15 age group was more (40.50%) in group - I than the other two. The percentage of males to the total members was found to be more (58.75%) in the group I and that of females in the second group (43.48) percent.

### Literacy

Literacy of the farmer is often a factor that affects the quality of farm business. It carries more importance in respect of the adoption of new technology. For this obvious reasons, the literacy aspect of the sample families was studied. The details of educational status of sample are given in table 4.3

Table 4.3 Education Status of Sample Families

Group	Average; Percentage of Literacy					Percent-; Percent-	
	size of family	Primary School	Middle School	High School	Graduate	tage of litera-tes	tage of illite-rates
I	4.26	32.50	6.25	2.50	2.50	43.75	56.25
II	6.30	26.50	9.06	8.24	5.36	49.06	50.94
III	5.20	24.20	12.16	10.32	7.64	54.32	45.68
Sample average	5.17	28.67	8.47	6.11	4.57	47.82	52.18



It can be seen from the above table that the literacy percentage was declining from group - III to group - I (54.32, 49.06, 43.75 percentage respectively) upto secondary education, there was not much difference in literacy percentage among three groups, this is because they all get free education. High School and above education was not considerably good in group I because lack of finance. On an average, 47.82 percent of sample members were educated and the rest were uneducated.

#### Land Utilization:

To meet the requirements of increasing population, we require efficiency in farm business and this can be reckoned through the study of land utilisation. Utilization of land gives an idea about the extent of land under cultivation and intensity of cropping, in addition to this, it gives about uncultivated area.

The cropping intensity may be considered as an indicator of the efficient use of land. Table 4.4 shows the land utilisation and cropping intensity.

Table 4.4 Land utilization and Cropping Intensity

Size : Average:	Area in hectares			Gross	Cropping
Group: size of:	Net area:	Double		sown area	Intensity
: Holding:	sown	Cropped		(ha)	%
:	(ha)	area(ha)	:	:	:
I	2.53	2.47	0.42	2.87	116.10
II	4.56	3.73	1.31	5.04	135.10
III	12.14	11.90	2.72	14.62	122.85
Sample average	5.27	4.83	1.21	5.85	124.04



The table 4.4 clearly indicates that the cropping intensity was highest in group II (135.10%) when it's operated area was 4.56 hectares followed by group I with cropping intensity 122.65 which was quite close to the sample average. Gross sown area was highest 14.62 in group III. Intensity of cropping mainly depends on the area under irrigation.

#### Cropping Pattern:

The cropping pattern followed by a farmers indicates his preference for various crops, within the limitations of his resources. The cropping pattern of the sample farmers was studied to have general idea about the crops cultivated other than cotton, and is presented in the following table 4.5

It is observed from the table 4.5 that the cotton occupies a major place among the other crops. Next important crops in the sample area were chillies and paddy. Cotton occupies 31.5, 30.2 and 38.6 percent of gross sown area in first, second and third group respectively.



Table 4.5 Cropping Pattern

S.No.	Crops	Group I	Group II	Group III	Sample Average
1.	Cotton	0.92	1.62	5.63	2.16
2.	Chillies	0.83	0.90	2.30	1.17
3.	Paddy	0.21	1.10	2.76	1.06
4.	Groundnut	0.06	0.12	0.34	0.14
5.	Jowar	0.16	0.28	0.76	0.33
6.	Red Gram	0.07	0.06	0.22	0.10
7.	Other Pulses	0.21	0.23	0.61	0.30
8.	Tobacco	0.03	0.07	0.19	0.08
9.	Coriander	0.04	0.06	0.17	0.07
10.	Gram	0.02	0.03	0.12	0.04
11.	Turmeric	0.12	0.21	0.67	0.26
12.	Castor	0.02	0.07	0.23	0.08
13.	Vegetables	0.02	0.08	0.27	0.09
14.	Miscellaneous	0.16	0.21	0.34	0.22
Gross Area Sown		2.87	5.04	14.62	6.80

**Irrigation:**

Irrigation in the new agricultural strategy has a very important role to play adequate facilities of irrigation reduce the risk involved in farming and ensures better crop production. Most of the exotic varieties released during last few years have specific water requirements with regard to timing and quantity. The average area under irrigation and its percentage to net area sown is given in table 4.6.



Table 4.6 Area under Irrigation

Group	Irrigated area (ha)	Percentage to net area sown (ha)	Un-irrigated area (ha)	Percentage to net area sown (ha)	Net area sown (ha)
I	1.16	45.84	1.37	54.16	2.53
II	2.21	48.46	2.35	51.54	4.56
III	5.96	49.09	6.18	50.92	12.14
Sample Average	2.54	47.43	2.73	52.57	5.27

The total area under irrigation was found to be more in the third group than the medium and small groups. On an average, 48.2 percent area was under irrigation.

#### Sources of Irrigation:

Because irrigation charges and also cost incurred in providing it varies by its source and because the source determines the extent of assured water availability this aspect assumes importance. The source of irrigation and distribution of area according to source is given in table 4.7.

Table 4.7 Sources of Irrigation

Group	Canal	Tanks	Total
I	1.16	-	1.16
II	2.13	0.08	2.21
III	5.17	0.79	5.96
Sample Average	2.44	0.13	2.54



Canal and tanks are the two major sources of irrigation in sample villages. Table 4.7 shows that area under canal irrigation was more than area under tanks irrigation in all the three groups of farm holdings. This was due to the fact that canal irrigation was cheaper source of irrigation than tanks.

Family members working on the Farm :

Labour is the most important factor of the farm production. Human labour is met mostly from the family under Indian conditions. The family members, more over, save the out of pocket expenses on wages and thus, reduce the burden of giving money as wages. Therefore, this aspect was studied separately. The following table 4.8 gives the details of family members working on the farm.

Table 4.8 Family Members working on the Farm

Size Group	Average size of family	Members working on the farm	Percentage to size of family
I	4.26	3.12	73.23
II	6.30	4.16	66.03
III	5.20	1.15	22.11
Sample Average	5.28	3.17	59.92

Table 4.8 says that the average members working on the farm were more in group - II (4.16) farmers than group - I (3.12) and group -III (1.15) farmers. But



percentage to size of family of the same was highest in group- I (73.23) followed by group - II (66.03) and group III (22.11). This is because the average size of family was more in group -II than group - I farmers.

#### Adoption of High Yielding Varieties of Cotton:

The high yielding varieties have brought about a revolution in crop production. A large number of trials have proved to the farmers that adoption of high yielding varieties is really profitable than local varieties. But the adoption of high yielding varieties depends upon many other factors like fertilizer irrigation and plant protection measures. The table 4.9 shows the distribution of area under local and high yielding varieties of cotton grown by the sample farmers.

Table 4.9 Distribution of area under high Yielding and local varieties of cotton

Group	Area Under High Yielding Varieties	Area Under Local Varieties	Total
I	0.66	0.26	0.92
II	1.17	0.45	1.62
III	4.40	1.23	5.63
Sample Average	1.63	0.53	2.16

The area under high yielding varieties was only 76 percent of the total area under cotton. Average area under high yielding varieties was found to be more in the third group.



### Cost of Cultivation of Cotton:

The cost of cultivation includes the investment on the variable inputs used in the cultivation and the services rendered by the fixed assets. The cost of inputs used by the cultivators in the cultivation of cotton were calculated to study the contribution of each input in the total cost. A break-up of factor-wise distribution of cost per hectare is given in table 4.10.

The average total input cost per cropped hectare of High Yielding Varieties cotton comes to Rs 4885.44 while the same for traditional varieties worked out to Rs 2036.30. The difference in the per hectare cost of cultivation of High Yielding Variety cotton and traditional varieties of cotton approximated to Rs 2849.14. In both the cases the rental value of land increases the per hectare cost to a very great extent.

In case of High Yielding Varieties cotton for the example as a whole, the major items of expenditure were seen manures and fertilizers, insecticides, human labour and animal labour which worked out to be about 22.30, 18.94, 11.43 and 6.17 percentage of the total cost respectively.

In case of traditional cotton the main items of expenditure on input factors in order of merit were human labour, insecticides, manures and fertilizers and animal labour accounting for 18.21, 17.63, 15.63 and 8.54 respectively to the cost of cultivation. It was observed that no amount was being spent on irrigation for the cultivation of traditional varieties.

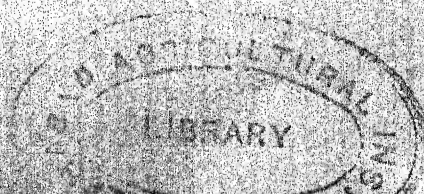




Table No. 10. Factor-wise distribution of Cost per hectare of HRV

Inputs	Group I	Group II	Group III	Sample Average
Family Labour	261.36 ( 5.62)	272.26 (5.27)	190.30 (3.85)	250.10 ( 5.13)
Hired Labour	267.31 ( 5.75)	297.31 ( 5.76)	405.00 ( 8.19)	306.82 (6. 30)
Mullock Labour	286.67 ( 6.17)	320.10 ( 8.20)	290.16 (5. 87)	298.98 ( 6.17)
Seed	200.00 ( 4.30)	200.00 ( 3.87)	200.00 (4.04)	200.00 ( 4.09)
Fertilizers and manures	960.00 (20.66)	1260.00 (24.48)	1139.10 (23.04)	1101.76 (22.30)
Plant Protec- tion	900.15 (19.37)	970.00 ( 18.81)	900.11 (18.20)	924.34 (18.94)
Irrigation	130.16 ( 2.80)	156.00 ( 3.02)	132.10 ( 2.67)	139.51 ( 2.86)
Land Revenue	55.62 ( 1.19)	55.62 ( 1.07)	55.62 (1 .12)	55.62 ( 1.16)
Depreciation	63.12 ( 1.35)	64.16 ( 1.24)	66.16 (1.33)	64.12 ( 1.34)
Cost for implements	95.15 ( 2.04)	102.10 (1.98)	97.16 ( 1.96)	97.98 ( 2.14)
Interest on Working Capital	96.74 ( 2.08)	110.91 ( 2.15)	104.34 ( 2.11)	103.25 ( 2.14)
Interest on Fixed Capital	99.18 ( 2.13)	108.10 ( 2.09)	112.32 ( 2.27)	105.05 ( 2.18)
Rental value of own land	1230.60 ( 26.48)	1240.00 (24.04)	1250.00 ( 25.29)	1237.96 (25.36)
<b>Total</b>	<b>4646.06</b> <b>(100.00)</b>	<b>5156.56</b> <b>(100.00)</b>	<b>4942.37</b> <b>(100.00)</b>	<b>4885.44</b> <b>(100.00)</b>



Table No. 11. Factor-wise distribution of Cost per Hectare (Local Varieties)

Inputs	Group I	Group II	Group III	Sample Average
Family Labour	184.12 ( 9.50)	198.13 ( 9.23)	125.00 ( 6.01)	176.46 ( 8.66)
Hired Labour	142.18 ( 7.34)	212.12 ( 9.88)	275.60 (13.39)	194.61 ( 9.55)
Bullock Labour	170.72 (8. 81)	180.72 ( 8.42)	170.13 ( 8.28)	174.06 ( 8.54)
Seed	38.15 ( 1.97)	39.00 ( 1.82)	39.00 ( 1.90)	38.62 ( 1.89)
Manures & Fertilizers	300.12 (15.48)	340.72 (15.87)	320.00 (15.55)	318.38 (15.63)
Plant Protection	350.13 (18.07)	370.77 (17.27)	250.80 (17.04)	358.10 (17.63)
Irrigation	-	-	-	-
Land Revenue	35.00 ( 1.80)	38.00 ( 1.77)	30.00 (1.86)	36.67 ( 1.80)
Depreciation	58.90 ( 3.04)	62.10 ( 2.89)	58.18 (2.83)	59.86 ( 2.94)
Rent for Implements	45.12 (2.32)	49.35 ( 2.30)	47.13 (2.29)	47.01 ( 2.30)
Interest on Working Capital	42.72 (2.20)	47.07 (2.19)	44.56 ( 2.18)	44.62 (24.73)
Interest on Fixed Capital)	51.00 ( 2.63)	58.65 ( 2.75)	56.12 ( 2.73)	54.73 ( 2.69)
Net Value of own Land	520.00 (26.84)	550.00 (25.63)	533.23 (25.92)	533.18 (26.18)
Total	1938.16 (100.00)	2146.63 (100.00)	2057.75 (100.00)	2036.30 (100.00)



### Concept-wise break-up of Input Cost:

The total cost of cultivation has been split up according to cost concepts. There was no leased in land with any of the grower. Therefore cost A<sub>1</sub> and A<sub>2</sub> are the same. Table 4.12 illustrates cost per hectare based on cost concepts.

Table 4.12 Cost per hectare according to cost concepts

Group	Rupees					
	High Yielding Varieties			Local Varieties		
	Cost A <sub>1</sub>	Cost B	Cost C	Cost A <sub>1</sub>	Cost B	Cost C
I	3054.92	4384.70	4646.06	1183.04	1754.04	1938.16
II	3536.20	4884.30	5156.56	1339.85	1948.50	2146.63
III	3389.75	4752.07	4942.37	1343.40	1932.75	2057.75
Sample Average	3292.34	4635.45	4885.45	1271.24	1859.16	2035.62

It was observed that cost A<sub>1</sub> per hectare was much higher for High Yielding Varieties other than the traditional varieties. The per hectare cost according to each of the cost concepts for High Yielding Varieties and local varieties were more in case of group two farmers.

### Returns from Cotton:

The yield and gross income per hectare of High Yielding Varieties and local varieties was given in the following table No. 4. 13.



Table 4. 13 Yield and Gross Income per Hectare

Group	High Yielding Varieties		Local Varieties	
	Yield (Qt.)	Gross Income (Rs)	Yield (Qt.)	Gross Income (Rs)
I	21.72	9879.00	15.50	4650.00
II	24.16	10987.00	17.30	5190.00
III	22.18	10091.00	16.60	4980.00
Sample Average	2216	10307.26	16.35	4906.73

The yield of High Yielding Varieties and local varieties was found more in second group followed by third and first group. Total output in monetary terms which includes the value of by-product was found out for all farms. The gross income also shows the same trend on different groups as it was in the case of physical output. On an average, cotton High Yielding Varieties offer an addition gross income to the extent of Rs 5400.53 per hectare over local varieties.

#### By-product of Cotton:

Cotton stalks a by-product of cotton can be used for preparation of compost and manufacture of paper pulp. But the large proportion of cotton stalks were found to be used as fuel in villages. Cultivators found it uneconomical to transport it, and as a result they burn the excess stalks in the field itself. The contribution of main and by product in the gross income was given in table 4.14.





Table 4.14 Contribution of Main and By-product  
to the gross income

Group	Rupees			
	High Yielding Varieties		Local Varieties	
	Main Product: By-Product		Main Product: By-Product	
I	9774.00 (98.93)	105.00 (1.07)	4572.50 (98.33)	77.50 (1.67)
II	10872.00 (98.95)	115.00 (1.05)	5103.50 (98.33)	86.50 (1.67)
III	9981.00 (98.90)	110.00 (1.10)	4897.00 (98.33)	83.00 (1.67)
Sample Average	10605.66 (98.93)	109.51 (1.07)	4824.55 (98.33)	83.78 (1.67)

The contribution of by-product to the main product was found to be very less in High Yielding Varieties. The reason is that the high Yielding Varieties required more spacing than local varieties.

#### Measures of Farm Profits:

To judge the profitability of farming the income measures that is net income, family labour income, farm business income and farm investment income have been found suitable by farm manager under Indian conditions. The following table 4.15 shows farm profits per hectare.





Table 4.15 Farm Profits Per Hectare

Group HYVs	Rupees			
	Net Income	Family Labour Income	Farm Business Income	Farm Investment Income
I	5232.94	5494.36	6824.08	6562.72
II	5830.44	6102.70	7450.80	7778.54
III	5148.63	5338.93	6701.25	6510.95
Sample Average	5421.93	5672.05	7015.03	6764.94
Local				
I	2711.84	2895.96	3467.00	3202.84
II	3043.37	3241.50	3850.15	3652.02
III	2922.25	3047.25	3636.60	3511.60
Sample Average	2851.87	3047.57	3635.54	3459.02

It was seen from the table that the High Yielding Varieties gave higher net income, family labour income, farm business income and farm investment income per hectare than the local varieties.

The High Yielding Varieties gave Rs 2570.06 as additional net income per hectare over local varieties. Net income on the second group farm was observed to be higher followed by first and third group for the High Yielding Varieties and local varieties.





Input - Output Ratio:

Input - output ratio were calculated to compare the returns per rupee investment from each variety. The ratios for High Yielding Varieties and local varieties on three groups of holding are given in the table 4.16 below.

Table 4.16 Input - Output Ratios

Group	High Yielding Varieties	Local Varieties
I	1 : 1.89	1 : 2.40
II	1 : 2.13	1 : 2.42
III	1 : 2.03	1 : 2.42
Sample Average	1 : 2.00	1 : 2.41

The input - output ratios for High Yielding Varieties and traditional varieties respectively worked out to be 1 : 2 or 1 : 2.41. The input and output ratio was more in second group, followed by third and first group.

Cost of Production Per Quintal:

It has already been discussed in table 4.13 that the by-product of cotton fetches negligible price. Its contribution to gross income was also found negligible. Hence, the cost for the by-product was ignored while working out the cost of production per quintal.



It was generally accepted to include the cost of transportation and marketing while working out the cost of production. The cost of production per quintal on the basis of cost concepts and after including transportation and marketing charges is shown in table 4.17.

Table 4.17 Cost of Production of Cotton Per Quintal according to Cost Concepts

Group	High Yielding Varieties			Transportation & Marketing	Total
	Cost A <sub>1</sub>	Cost B	Cost C		
I	140.65	201.87	213.91	4.25	218.16
II	146.37	202.16	213.43	4.35	217.78
III	152.83	214.25	222.83	4.30	227.13
Sample Average	145.21	204.59	207.94	4.30	219.93
Local Varieties					
I	76.33	113.16	125.04	4.20	129.24
II	77.45	112.63	124.08	4.20	128.33
III	80.93	116.43	123.96	4.22	128.18
Sample Average	77.69	113.67	124.49	4.22	128.72

It was observed from the table that cost A<sub>1</sub> per quintal was much higher for High Yielding Varieties than traditional varieties. The overall per quintal cost for High Yielding Varieties approximates to Rs 219.93 the corresponding figure for local variety worked out to be about Rs 128.72.



## Cost of Cultivation of Three High Yielding Varieties of Cotton.

Table 4.18 Factor-wise distribution of cost per hectare for High Yielding varieties of cotton.

Inputs	Group I sect-5 Variable: $H_2$	Group II M.C.U-5 Variable: $H_2$	Group III sect-5 Variable: $H_2$
1. Family Labour 259.00	264.32	260.54	263.19
2. Hired Labour 258.19	274.15	269.00	287.19
3. Bullock Labour 271.10	306.73	281.15	282.10
4. Seed 30.00	370.00	200.00	30.60
5. Manures & Fertilizers 650.00	1060.00	970.00	1170.00
6. Plant Protection 840.60	950.15	910.00	980.00
7. Irrigation 93.32	170.16	125.13	106.00
8. Land Revenue 55.62	55.62	55.62	55.62
9. Depreciation 62.16	64.14	63.17	63.30
10. Rent for Implements 93.19	97.15	94.14	97.30
11. Interest on Working Capital 87.16	106.14	95.12	99.16
12. Interest on Fixed Capital 94.16	104.14	98.96	106.12
13. Total Value of own land.	1230.14	1240.10	1230.60
Total 4216.62	5062.60	4653.43	4770.46



From the above table 4.18 the cost of cultivation in three varieties it was found in the second group to be higher followed by third and first group. It can be seen that it is the rental value of owned land which increases the total cost to a great extent. Manures and fertilizers, a major item of expenditure, cost of seed is also a major item of expenditure for the producers of Varalaxmi and H<sub>4</sub>.

#### Returns from Cotton:

The Physical output of cotton - the yield of seed cotton - has been studied on the sample farms. The yield per hectare of High Yielding Varieties is given in the following table 4.19.

Table 4.19 Yield of Cotton Per Hectare

Group	MCU - 5	Varalaxmi	H <sub>4</sub>
I	21.65	22.65	27.73
II	23.75	24.83	31.43
III	21.41	22.95	27.69

From the above table 4.19 that H<sub>4</sub> variety yields more followed by Varalaxmi and MCU - 5. All these varieties yielded more on second group farms and least on the first group.

Total output in monetary terms which includes the value of by-product. The selling price per quintal for long



staple variety is more than short staple variety. Gross income per hectare is given below.

Table 4.20 Gross Income Per Hectare

Group	MCU - 5	Varalakshmi	H <sub>4</sub>
I	8436.00	11402.80	9791.43
II	9600.48	12541.90	10874.10
III	8664.48	11640.73	9785.80

The above table explains that Varalakshmi Variety gives more monetary returns than other varieties. The gross income also shows the same trend on different groups as it was in the case of physical output.

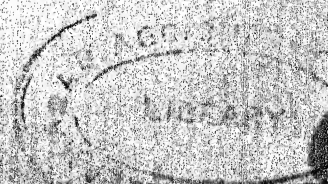
Net Income per Hectare:

The net income per hectare is given below in Table 4.21.

Table 4.21 Net Income Per Hectare

Group	MCU-5	Varalakshmi	H <sub>4</sub>
I	4220.00	6340.00	5138.00
II	4830.00	6920.00	5741.00
III	4160.00	6280.00	5005.00

It is seen from the table 4.21 that Varalakshmi variety gives higher net income than other two varieties. Net income on the second group farm was observed to be higher followed by first and third group.





**Statistical Analysis to get significant difference between High Yielding Varieties and Local Varieties.**

**There is significant difference in net income from High Yielding Varieties over local varieties.**

**The statistical analysis to get the significant difference between high yielding varieties and local varieties the method of analysis of variance has been used in the calculation for this test.**

**The following table gives the net income between the high yielding varieties and local varieties for different size groups. The following table 4.22 showing the net income between High Yielding Varieties and local varieties for different size groups.**

**Table 4.22 Net Income between High Yielding Varieties and Local Varieties**

<b>Group</b>	<b>HYV</b>	<b>Local</b>	<b>Total</b>
<b>I</b>	<b>5233</b>	<b>2712</b>	<b>7945</b>
<b>II</b>	<b>5830</b>	<b>3043</b>	<b>8873</b>
<b>III</b>	<b>5149</b>	<b>2922</b>	<b>8071</b>
<b>Total</b>	<b>16212</b>	<b>8677</b>	<b>24889</b>

**Since the figures are very big they have been divided by constant thousand to reduce them to a manageable figure and furthermore the figures are rounded to the whole.**



Variety/ Group	HYV	Local	Total
I	5.0	3.0	8.0
II	6.0	3.0	9.0
III	5.0	3.0	8.0
Total	16.0	9.0	25.0

Table 4.23 For Analysis of Variance

Sources of Variation	D.F.	S.S.	M.S.	Variance	F		
					1%	5%	10%
Varieties	1	8.17	8.17	47.65	98.49	99.30	
Groups	2	0.34	0.17	1.06			
Error	2	0.33	0.16				
Total	5	8.84					

Hence F test indicate that there are significant difference between the local and the high yielding varieties, means, since observed value of the variance ratio is significant at 5% level.

Thus the hypothesis proved i.e. the high yielding varieties gives better net income over local varieties.



Statistic analysis to find out the significant difference within the varieties in the High Yielding varieties cultivated in the area of the study.

Null hypothesis shows there is significant difference in net income within the varieties MCU-5, Varalaxmi and H<sub>4</sub>.

The following table gives the net income within the High Yielding Varieties under different size groups.

Table 4.24 Net Income within the H.Y.V.

Variety/ Groups	MCU-5	Varalaxmi	H <sub>4</sub>	Total
I	4220.00	6340.00	5139.00	15699.00
II	4830.00	6920.00	5741.00	17494.00
III	4160.00	6280.00	5005.00	15445.00
Total	13210.00	19540.00	15884.00	48634.00

Since the figures are very big they have been reduced by dividing them with a constant figure of one thousand and further rounded upto whole number.

Variety/ Groups	MCU-5	Varalaxmi	H <sub>4</sub>	Total
I	4.00	6.00	5.00	15.00
II	5.00	7.00	6.00	18.00
III	4.00	6.00	5.00	15.00
Total	13.00	19.00	16.00	48.00



Table 4.25 Analysis of Variance

Source of Variation	D.F.	S.S	MSS	Variance	F	
					1%	5%
Variety	2	-88	-44	1.76	21.20	7.4
Group	2	-23	-12.2	0.47		
Error	4	-103	-25.7			
Total	8	8				

Here F test indicates that there are no significant differences within the varieties and also within the groups. Since the observed value of the variance is non-significant at 5% level.

In order to find out the High Yielding Varieties significant, a critical difference based on analysis of variance has been calculated. The varieties have been by setting them in descending order of their net incomes in the following manner.

	2	3	1
I	6	5	4
II	7	6	5
III	6	5	4

Calculation of critical difference.

Standard error of the difference between the three varieties means  $\frac{2VE}{F}$

Standard error = 5.6

Critical difference = 15.512



$$= \frac{2 \times -25.7}{2}$$

$$= \frac{-51.4}{2}$$

$$= 25.7$$

$$= 5.06$$

$$C.D. = 5.6 \times t_{.05} \quad 2.77$$

$$= 15.512$$

From the analysis of critical difference it was found there was no significant difference within the varieties.

Thus the null hypothesis is approved.

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## CHAPTER V



## SUMMARY AND CONCLUSION

Indian economy is a developing economy and therefore rate of growth plays an important role to bring the country to achieve economic independence. The national income constitute approximately 50 percent from the agricultural sector. Unfortunately per unit output in the agricultural sector is very low as compared with other countries. In order to achieve self-sufficiency in the food crops as well as other items of agricultural origin per hectare yield has substantially increased because extensive cultivation is not possible and naturally improved method of cultivation is necessiated.

The present study is confined to a comparative study of the local and high yielding varieties of cotton crop in Tyalljuru block in Guntur District, Andhra Pradesh. Cotton is a commercial crop and much of the cash income of the farmers come out of its cultivation. In the interest of national economy and farmers own interest it is obligatory to obtain higher productivity per unit of input. It is on account of this fact that there is a competition between food and non-food crops for the scarce resources. The present study is based on the hypothesis that the high yielding varieties of cotton give high net income than local varieties. It is further aimed in this study to

find out the most suitable variety out of the recommended high yielding varieties to farmers that they get maximum returns out of their investment.

Achievement in the level of cotton output to a great extent depends on the profitability of the High Yielding Varieties. A comparative study of the economic aspects in the cultivation of High Yielding Varieties and traditional varieties was, therefore, felt timely and useful in the context of the felt need mentioned above as also in the context of available new strains involving new technology.

Tyalluru Block of Guntur District of Andhra Pradesh was purposively selected because cotton is cultivated by large number of farmers in this area. The data were collected from 52 farmers cultivating both high yielding varieties and traditional cotton varieties through the field investigations conducted during the year 1974-75. The survey was conducted by "personal interview" method with the help of a pretested questionnaire in keeping with the objectives of the study.

Cropping intensity for an average farm was found to be 124.04 percent. Cotton occupies about 31.5 , 30.2 and 38.6 percent of gross sown area in first, second and third groups respectively. Of the total area under cotton high yielding varieties accounted for 76 percent. Sample farmers had about 47 percent of net sown area under irrigation.



But there was insignificant difference in the groups. Canal was the major source of irrigation.

The per hectare cost of cultivation of High Yielding Varieties and traditional cotton varieties worked out to about Rs 4885.44 and Rs 2036.30 respectively. Thus, High Yielding Varieties cotton growers had to incur about Rs 2749.14 more than the traditional cotton variety growers. The cost of cultivation between the size group for MCU-5 was Rs 4216.62, Rs 4770.48 and Rs 4504.48 for first, second and third size groups respectively. For Varalaxmi it was Rs 5062.80, for the first size group and Rs 5621.90 for second size group and Rs 5360.73 for third size group. For variety H<sub>4</sub> the cost per hectare for group I, II and III were Rs 4338.86, Rs 4732.66 and Rs 4598.60 respectively.

Examining the cost on various items, it was found for both the variety classes that the rental value of land increased the per hectare and also per quintal cost to a very great extent. In case of High Yielding Varieties cotton varieties, for the sample as a whole, the major items of expenditure were manures and fertilizers, insecticides, human labour and animal labour respectively covering about 22.30, 18.00, 18.00 and 18.00 percent of cost C.

For cotton the main items of expenditure on input factors in order of merit were human labour, insecticides, fertilizers and manures respectively

accounting for 18.21 percent, 17.63, 15.63 and 8.54 percent to the total cost of cultivation.

The yield of main product per hectare for High Yielding Varieties was 20.16 quintals and 16.35 quintals for local varieties. The value of total gross income per hectare for local and high yielding varieties were Rs 10307.26 and Rs 4906.73 respectively. As regards the measures of farm profits for High Yielding Varieties it was found that the net income, family labour income and farm business income were Rs 5421.93, Rs 5672.05, Rs 7015.03 and Rs 6764.94 respectively. Like-wise for local varieties these were Rs 2851.87, Rs 3047.57, Rs 3635.05 and Rs 3459.02 respectively. Net income per hectare from MCU-5 Varalakshmi and H<sub>4</sub> was Rs 4403.00, 6513.00 and 5295.00 respectively.

The input and output ratio was 1 :2.00 and 1:2.41 over High Yielding Varieties and local Varieties respectively.

The cost of production per quintal was Rs 219.93 for High Yielding Varieties and for local varieties it was Rs 128.72.

The Analysis of Variance worked out to find the significant difference between the high yielding and local varieties and it was found that there was significant difference between local and High Yielding varieties at 5 percent level. Therefore High Yielding Varieties are recommended for adoption for the area under study.



Further analysis of variance was done to find the significant difference within the High Yielding Varieties and it was found that there is no significant difference at 5 percent level. This was also testified by working out critical difference for these varieties.

#### CONCLUSION:

The study throws light on the fact that the farmer should adopt High Yielding Varieties for higher net income rather than local varieties and this will meet the best utilization of existing resources. Within the High Yielding Varieties it was found that there was no significant difference in the net income obtained by their cultivation. It means the farmers can grow any of the three varieties to get the higher income from cultivation of crops.

#### SUGGESTIONS:

1. The State Department of Agriculture should keep a close watch on the farmers cultivating High Yielding Varieties of cotton and give timely technical advices.
2. The small farmers should be encouraged to take High Yielding Varieties and should be financed by credit institute like Co-operatives or Banks.

3. Shortage of fertilizers calls for an action to give training to farmers for timely and efficient use of available quantity of fertilizers with intensive use of available labour.

4. By-product of cotton which goes as waste should be utilized in preparing compost.

5. High rates of returns of cotton will remain meaningless unless the produce finds its way into the market. Therefore, it is suggested that farmers should be given facilities for marketing the price of cotton should be stabilized through Government support price in order to encourage cotton cultivation.



## LITERATURE CITED

Books:

1. Chandel, S.R.S., A Handbook of Agricultural Statistics; Achal Prakashan Mandir, Kanpur, 1970.

Reports:

2. Draft Fifth Five Year Plan Vol. 1, 1973. New Delhi, Planning Commission, Govt. of India.
3. Mirchandani, G.G. 1971. Aspects of Agriculture in India (UNI Record). Bombay : Allied Publishers.

Journals:

4. Choken Singh, "More from Irrigated Cotton" Intensive Agriculture, Vol. XII, No. 10, Dec. 1974, pp. 14.
5. Dixit R.S., Mishra, S.D. "An Economic Analysis of Cotton Cultivation". Agri. Situation in India, Vol. XXIII, No. 10, Jan. 1969. pp. 1031-6.
6. Gangwar, A.C. and Singh I.J. "Economic feasibility of financing Cotton Growers in Hissar District Haryana." Finance Agriculture Vol. VII, No. 1, April-June 1973, pp. 14-16.
7. Garg, J.S. and Singh, G.N. "Economics of Production and Marketing of Cotton in Bulandshahr District - A Case study." Agricultural Marketing, Vol. XIII, No. 3, Oct. 1970, pp. 1-5.
8. R. Kaul, J.G., Sondhi, R.K. "Differential Growth of Productivity in the Punjab". World Agricultural Economics and Rural Sociology Abstracts, Vol. 16, No. 1, Jan. 1974, pp. 38.

9. Nute, S.B. "Crop Insurance under GSFC 4-P Plan"  
Agriculture and Agro-Industries Journal, Vol. VI,  
No. 11, Nov. 1973. pp. 5-8
10. Madalia, V.K., Mukadia, M.U. "A study on Economics of  
Cotton cultivation in Baroda District".  
Finance Agriculture, Vol. VII, No. 111, Oct. Dec.  
1973, pp 15-18.
11. Maharaja, M.H. Economics of cotton cultivation. "A Study  
in a selected region of Saburkantha District in  
Gujrat." World Agricultural Economics & Rural  
Sociology abstracts. Vol. VIII, No. 4, Dec. 1966  
pp.706.
12. Mudhekar, Anantwar, I.P.S.J. A Population Explosion in  
Cotton for higher Production". Farmer and  
Parliament. Vol. VIII, No. 8, Aug. 1973 pp. 15-16.
13. Muthuswami Gopalan, "Importance of white gold in the  
nation's economy.". Khadi Gramodaya. Vol. XV,  
No. 9, pages 441-444.
14. G. Parthasarathy, Indian Journal of Agricultural  
Economics. Vol. XXVII, No. 2, April-June, 1972,  
pp. 103.
15. Pattanshetti, C.C. and Gopal Rao, H.S., "Regulated  
markets and Agricultural Prices". The Journal of  
Karnataka University - Social Sciences, Vol. II,  
May 1966. p. 12.
16. Raingeard, J.E. "Expansion of the world cotton market"  
World Agricultural Economics and Rural Sociology  
Abstracts Vol. No. 16, 4 11, Nov. 1974 pp 16-17.
17. Reddy, A.S. and Venkateswarlu, V., "The Economics of  
Cotton (MCU-5) Cultivation in Guntur District,  
Andhra Pradesh, " 'Agriculture and Agro-industries  
Journal, Vol. VI, No. 11, Nov. 1973, pp. 3-4.



18. C. Rajagopal Reddy "Economics of Varanasi Cotton Cultivation in Guntur District, Andhra Pradesh." Financing Agriculture, Vol. VI, No. 4, Jan. 1973. pp. 16-17.
19. O.B. Rao, M.V. Pavate, B.V. Verma, "Shift of area towards better staple Cotton". Agriculture and Home-Industries Journal Vol. 7, No. 7, July 1974, pp. 13-16.
20. Singh, N., Singh, K. and Brar, H. 1974. How Cotton Yield can be Raised. Progressive Farming, Mar. 10.
21. Shukla Hazra - 'Intensive Agriculture', Vol. No. 7, September 1972, pp. 119.
22. Shukla, B.D. and Singh, R.S. "Economics of Cotton Cultivation in Mathura District". World Agricultural Economics and Rural Sociology abstracts Vol. XI, No. 4, Dec. 1969 pp. 700.
23. "Cost of Cultivation in Maharashtra State", Statistical News Letter, I.A.R.I., New Delhi, Vol. XII, No. 1, April 1965, pp. 12-15.
24. .... "Stepping Up Cotton Production - Three-Year Programme Launched", Farmer and Parliament, Vol. VI (9), September 1971, pp. 19-21.

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## APPENDIX

### Method of Evaluation

#### A. Evaluation of Farm Assets:

Self cultivated lands have been evaluated at the rates prevailing in the village at the time of enquiry taking into account the type of soil, distance from village, irrigation etc.

##### (1) Farm Lands and Houses etc.

Evaluated at the market price at the time of enquiry.

##### (2) Implements and Machinery

Evaluated at the market price.

#### B. Evaluation of Farm Output

Crops both main and by-products, fodder etc. have been evaluated at the market price at the time of enquiry.

#### C. Evaluation of Farm Inputs

##### (1) Casual hired labour:

Actual amount paid in cash/value of kind payment evaluated at harvest prices.

##### (2) Family Labour:

The cost of labour days has been evaluated at the village average rate for annual servant. Permanent labour is treated as family labour.

##### (3) Labour Utilization:

A labour day in case of male was taken as 8 hours



and 6 hours in the case of female.

(4) Bullock Labour

Owned and hired bullocks were charged at a flat rate prevailing in the village for hiring in bullocks.

(5) Supervision:

These charges have not been included.

(6) Seed, Manures and Fertilizers:

The actual amount paid in the purchase of these items was considered. The value of home produced farm yard manure was taken on the basis of prevailing market rate.

(7) Irrigation Charges:

In the case of canal irrigation, the amount paid for the area under cotton was considered. The actual irrigation cost has been calculated in the following manner.

Irrigated area under each crop was multiplied by the number of irrigations given to that crop and summed up. The total cost of irrigation was divided by the summation to arrive the cost of one irrigation per acre.

(8) Land Revenue:

Actual amount paid for the area under cotton.

(9) Rent Paid for Implements:

Actual amount paid for hiring the implement was considered.

**(9) Depreciation:**

Depreciation on the assets was calculated by "straight line method". The total depreciation was distributed according to area under each crop.

**(10) Interest on Working Capital:**

Calculated at 3 percent of the working capital for cotton.

**(11) Interest on Fixed Capital:**

After depreciating the fixed capital, the value at 1st June 1975 was calculated and interest calculated at 6 percent rate. The capital engaged in the irrigation has already been considered while calculating irrigation charges. Hence, it was ignored here.

**(12) Rent:**

There was no leased in land with sample cultivators. The rental value of owned land was estimated at the rate of 6 percent of present value of land based on the long term loan.

**(13) Marketing Charges:**

Include transportation, octroi, market cess, weighing charges etc.

**B. COST CONCEPTS**

The collected data were analysed by applying the following cost concepts.



**Cost A1:** It is actual paid out cost for owner cultivator. This cost approximates the expenditure incurred in cash and /or kind and include the following items, (1) Hired human labour (2) Owned and hired bullock labour (3) Seeds (4) Manures and Fertilizers (5) Expenses on plant protection (6) Depreciation (7) Rent paid for implements (8) Land revenue (9) Irrigation charges, and (10) Interest on working capital.

**Cost A2:** Cost A1 rent paid for leased in land.

**Cost B:** Cost A2 + rental value of owned land + interest on owned fixed capital.

**Cost C:** Cost B + imputed value of family labour.

**(C) MEASURES OF FARM INCOME:**

- (1) **Farm business income:** Computed by deducting Cost A1 from gross income
- (2) **Family labour income:** Obtained by deducting Cost B from gross income.
- (3) **Net income:** The excess of gross income over cost C.
- (4) **Farm investment income:** The excess of gross income over Cost C, excluding from it the rental value of owned land and interest on fixed capital.

PROFORMA OF FAMILY SCHEDULE

Name of the cultivator \_\_\_\_\_

Village \_\_\_\_\_ Block \_\_\_\_\_ District \_\_\_\_\_

Family Members \_\_\_\_\_ Male \_\_\_\_\_ Female \_\_\_\_\_ Children \_\_\_\_\_

Below 15 \_\_\_\_\_ 15 to 59 years \_\_\_\_\_ 60 years &amp; above \_\_\_\_\_

Total \_\_\_\_\_ Primary \_\_\_\_\_ Secondary \_\_\_\_\_ High School \_\_\_\_\_  
 Literates \_\_\_\_\_ Education \_\_\_\_\_ Education \_\_\_\_\_ Education \_\_\_\_\_

No of members:  
 working on the  
 Farm \_\_\_\_\_

Male \_\_\_\_\_ Female \_\_\_\_\_ Children \_\_\_\_\_

2. LAND UTILISATION:

S.No.	Items	Total area
-------	-------	------------

1. Total Holding

2. Operated Holding

3. Permanent Fallow

4. Net area sown

5. Gross Area sown

6. Land under Irrigation

3. DETAILS OF LAND UNDER COTTON:

Plot No.	Area	Present value	Variety of Cotton	
			Irrigated	Unirrigated

4. CROPPING PATTERN:

Plot S. No.	Area		Name of the crop		
	Irrigated	Unirrigated	Kharif	Rabi	Zaid

5. CROPPING INTENSITY6. IRRIGATION SOURCES

Crop	Area	Wat.	No. of Irrigations
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**7. INVENTORY OF IMPLEMENTS AND MACHINERY:**

S. No.	Nature of the Imple- ments	No.	Date of		Deprecia- tion	Value on 31st May to June, 1975.
			Purchase	Price		

**A) Implements.**

1. Iron plough
2. Wooden Plough
3. Harrow
4. Hoes
5. Bullock cart
6. Miscellaneous implements.

**B) Machinery**

1. Sprayers
2. Dusters
3. Electric Pump with accessories.
4. Oil Engine with accessories.
5. Other machinery

**C) Others**

1. Rope
2. Kudali
3. Pawada
4. Axe
5. Sickel & others

**8. LIVE STOCK INVENTORY:**

S.No.	Items	Age	Year of Purchase	Price	Value	
					At the begin- ning of the year	At the end of the year

**A. BULLOCKS:**

- 1.
- 2.

**B. COWS**

- 1.
- 2.





7. Irrigation
8. Watching
9. HARVESTING:
  - i. Picking of cotton
  - ii. Carting
  - iii. Cleaning
10. Marking:

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#### 11. LABOUR AND MATERIAL REQUIREMENTS

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Sr. No.	Items	Units /Quantities	Total cost/ value
1.	a) Hired Labour Male/Female b) Family labour Male/Female		
2.	Bullock labour		
3.	Manures (Cart load)		
4.	Fertilizers		
5.	A) Nitrogenous		
	i)		
	ii)		
	B) Phosphates Fertilizer		
	i)		
	C) Potash Fertilizers		
	i)		
	D) Mixed Fertilizers		
	i)		
	ii)		
5.	Seed:		
6.	Insecticides/Pesticides		
	i)		
	ii)		
7.	Irrigation charges		
8.	Marketing cost (Cotrai, Dalal etc.		
9.	Land Revenue		
10.	Others		

## 12. PLOTWISE YIELD OF THE CROP:

Plot No.	Area in Hect- ares	Yield per <u>HECT.</u>		Total <u>Yield</u>		Value per <u>quintal</u>		Total <u>value</u>	
		Kapas	Stalk	Kapas	Stalk	Kapas	Sta- lk	Kapas	Sta- lk

1. FARM BUSINESS INCOME      ₹

2. FAMILY LABOUR INCOME      ₹